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User Manual

GSM enabled - SMS Protocol Converter

DZC-PCON-smsProtoCon-IE1

IE Model Code: PROTOCON-GSM

Revision: 1

Revision Date: Mar 2012

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INTRODUCTION

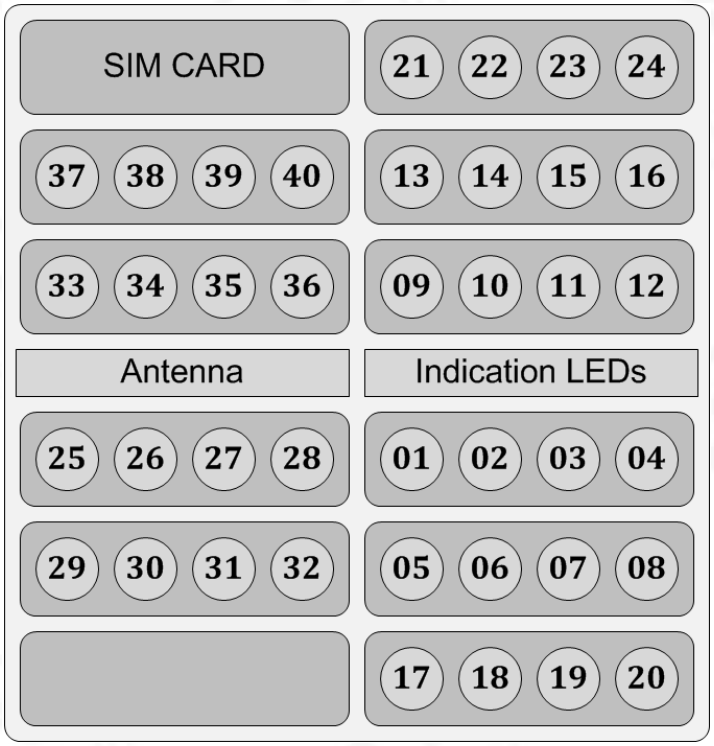
The DZC-PCON-SmsProtoCon-IE1 is a GSM-Enabled protocol converter and Input/Output Module for Innovative Energies Power Supplies with the following features:

- Communicates via the GSM (Global System for Mobile Communication) network.
- Communicated to the central uSCADA software and mobile phones via SMS (Short Message Service)
- Has 8 Volt Free Digital Inputs (Can be set to Normally Open or Normally Closed)
- Has 2 Relay Outputs (500mA @ 24VDC)
- Communicates with SR ... i DC UPS (back up charger) to provide the following information
    - Indications:
        - Battery Bad Alarm
        - Battery Missing Alarm
        - Battery Low Alarm
        - Power Supply Overload Alarm
        - Communication Interface (this device) to Power Supply - Comms. Alarm
        - Mains Failure Alarm
        - Battery Condition Test Active Alarm
    - Controls:
        - Battery Condition Testing Start/Stop
        - Automatic Battery Condition Testing Enable/Disable
- Fully compatible with the DoZeener Controls uSCADA Software
- Setup of a maximum of 4 mobile phone recipients and the central uSCADA base station
- Automatic Time Synchronization with the central uSCADA Software
- Two Level PIN Protection – Monitoring Only and Monitoring and Control
- 8 Automatic Update Periods to the central uSCADA software
- Possibility to set time delays before sending digital input and power supply digitals activation alarms.
- Possibility to disable digital outputs remotely
- Can be remotely configured via the GSM network.

DEVICE SCHEMATIC AND IO CONNECTIONS

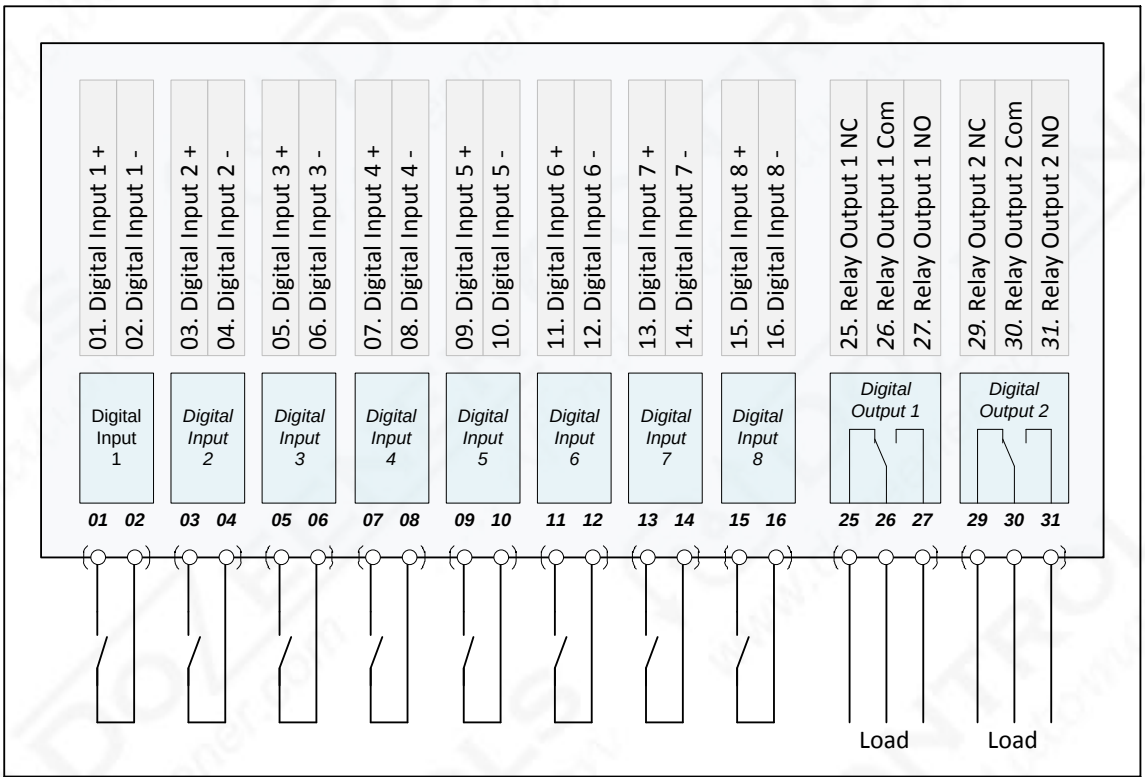
ELECTRICAL CONNECTIONS:

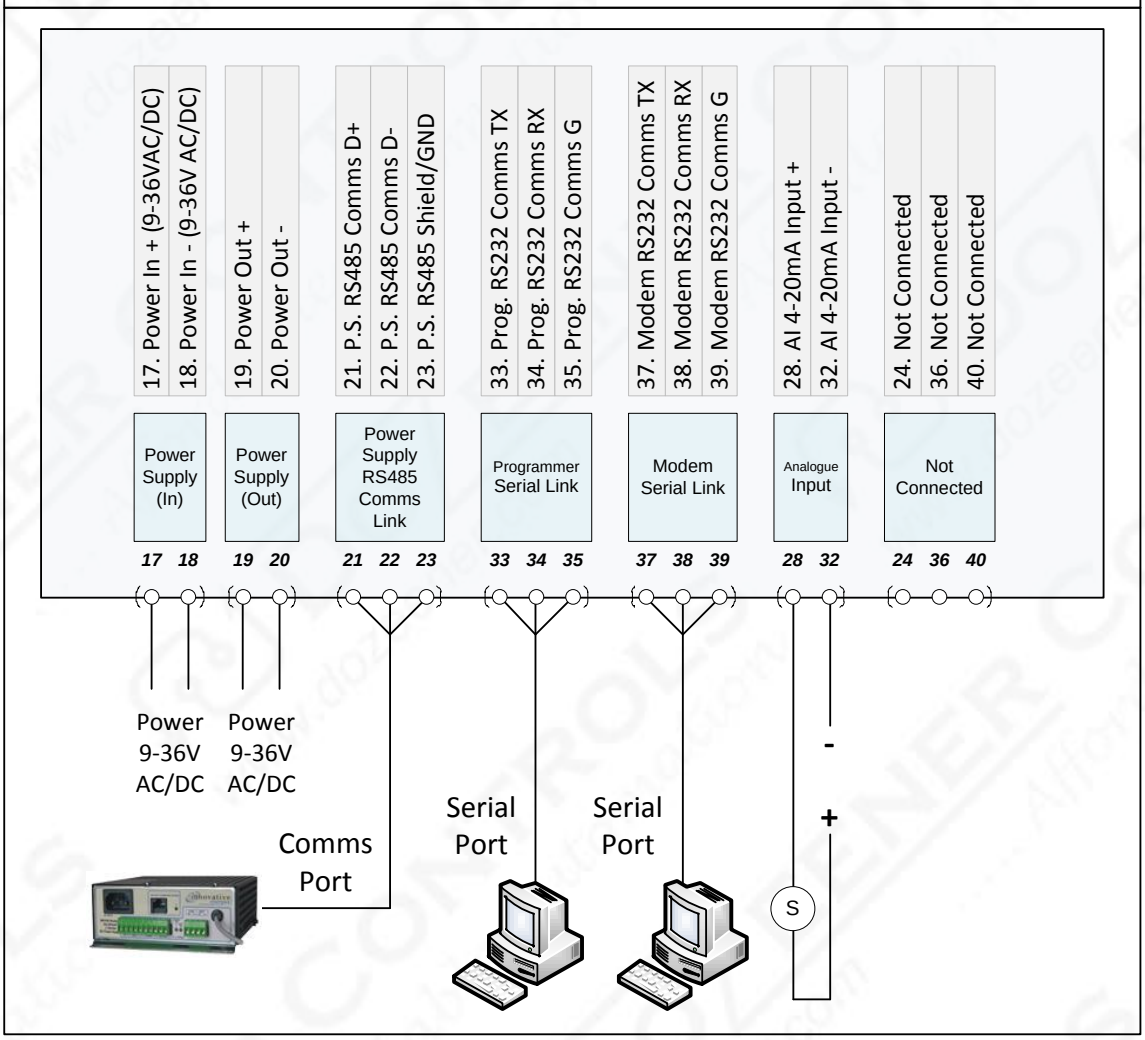
The diagram below shows the electrical connections as seen from above.



1. Digital Input 1 +
2. Digital Input 1 –
3. Digital Input 2 +
4. Digital Input 2 -
5. Digital Input 3 +
6. Digital Input 3 -
7. Digital Input 4 +
8. Digital Input 4 -
9. Digital Input 5 +
10. Digital Input 5 -
11. Digital Input 6 +
12. Digital Input 6 -
13. Digital Input 7 +
14. Digital Input 7 -
15. Digital Input 8 +
16. Digital Input 8 -
17. Power In + (9-36V AC/DC)
18. Power In - (9-36V AC/DC)
19. Power Out +
20. Power Out –
21. P.S. RS485 Comms D+
22. P.S. RS485 Comms D-
23. P.S. RS485 Shield/GND
24. Not Connected
25. Relay Output 1 NC
26. Relay Output 1 Common
27. Relay Output 1 NO
28. AI 4-20mA Input +
29. Relay Output 2 NC
30. Relay Output 2 Common
31. Relay Output 2 NO
32. AI 4-20mA Input -
33. Programmer RS232 Comms TX
34. Programmer RS232 Comms RX
35. Programmer RS232 Comms G
36. Not Connected
37. Modem RS232 Comms TX
38. Modem RS232 Comms RX
39. Modem RS232 Comms G
40. Not Connected

WIRING DIAGRAMS





FRONT PANEL INDICATIONS AND CONTROLS

The front panel of the device consists of the following LED indications:

Power:

- 5P (Red): Internal Power Supply 1 On
- 3P (Red): Internal Power Supply 2 On

Diagnostics:

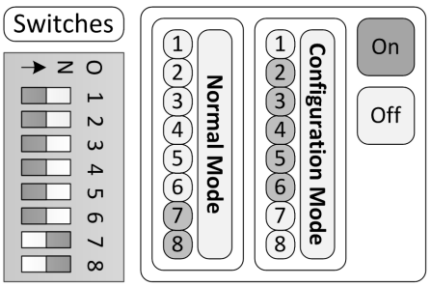
- GP (Yellow): GSM Modem Switched ON (Power ON)
- H (Yellow): General Health Indication. Flashing On/Off = Main Processor Active
- CR (Yellow): Communication Receive. This LED flashes when data is received from the power supply comms interface. When it flashes On/Off at the same regular interval as the 'H' indication, the communication to the power supply has been lost
- CT (Yellow): Communication Transmit. This LED flashes when data is being transmitted to the power supply communication interface.

Input/Output:

- I1 to I8 (Green): Digital Inputs 1 to 8 On/Off indication. When the digital input terminals are linked the LED lights up green, irrespective of whether the internal configuration of the digital input is configured as Normally Open or Normally Closed.
- O1 to O2 (Green): Digital Outputs 1 & 2 On/Off indication.

DIP SWITCHES SETTINGS & LOCAL PROGRAMMING OF THE DEVICE

Behind the cover where the antenna is located, is a set of 8 DIP switches. The position of these switches determines the mode of operation of the device and provides a way to communicate to the GSM modem via standard AT command. This feature can be useful to troubleshoot the modem and mobile network connectivity.



There are two modes in which the device can operate:

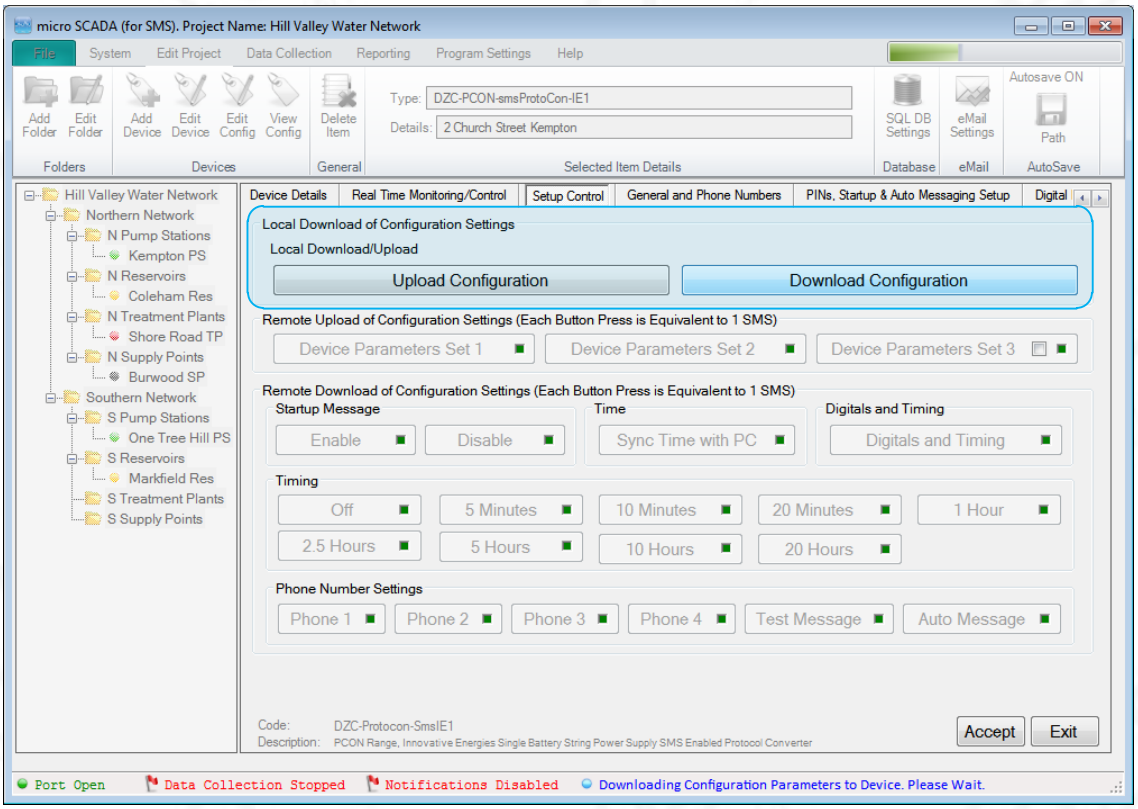
- Normal Operation Mode
- Device Local Configuration Mode

In the normal operation mode the device will establish a link to the GSM network and starts sending data according to its configuration, sending digital alarms to the programmed recipients if enabled, sending automatic updates to the uSCADA software and responding to requests. In normal mode the modem serial link and programmer serial link are disabled.

In local configuration mode a link with the GSM network is established but no information is sent on the network and the device does not respond to requests. The modem serial link and programmer serial link are enabled.

The modem serial link when connected to software similar to ‘Hyperterminal’ or ‘Putty’ can be ‘talked to’ using standard AT commands.

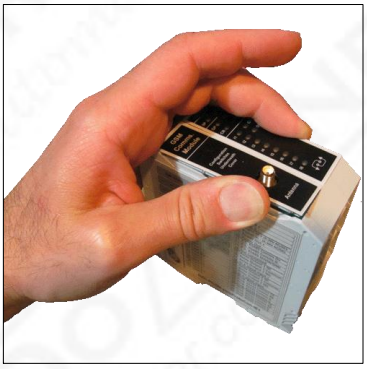
The programmer serial link is to be connected to the uSCADA software and local programming is enabled. The screenshot below shows the section in the uSCADA software used to locally program the device.



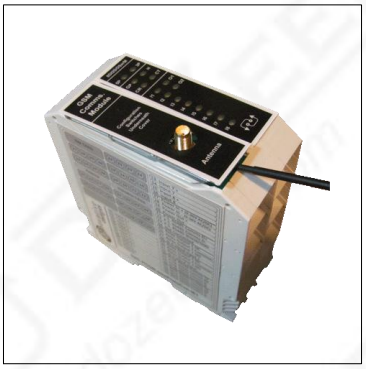
The switches can be accessed by removing the antenna, and opening the front cover as indicated below.

The device with antenna connected

Remove the antenna



Expose the bottom edge of the cover by lifting it from the side



While it is slightly lifted, fully open the cover using a small screwdriver

The Device with the switches uncovered

It is recommended the device be programmed using the local serial connection for the first time with subsequent updates done via SMSes, using the uSCADA software.

It is also possible to entirely program the device using SMS messages, using the buttons shown greyed out in the screenshot in the previous page.

All the configuration information is downloaded to the device by pressing all of the following buttons, ideally in this order.

1. Startup Message: Enable or Disable – Enables or disables the initial message sent to the uSCADA software or a mobile phone recipient. This is the request to synchronize the time and date at power-up.
2. Digitals and Timing: Downloads all the digital settings and digital alarm delays.
3. Phone Number Settings: Phone 1, Phone 2, Phone 3, Phone 4, Test Message and Auto Message.
4. Timing: Any button depending on the user preference. **The timing button press will be followed by a restart after a few seconds.**

This consists of a total of 9 SMS messages.

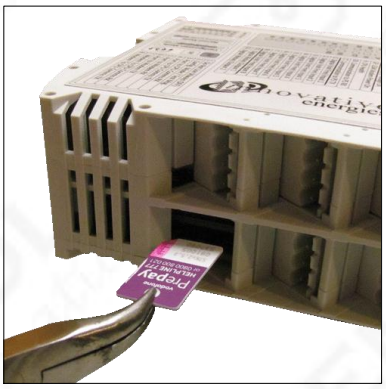
More information on the programming of this equipment can be found in the user manual:

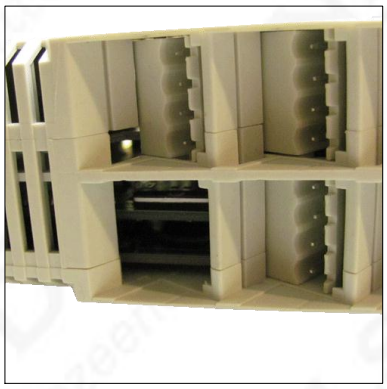
- DoZeener uSCADA for SMS (DZC-PCS-microSCADASMS).
  Document Code: DZC-PCSF-0010011-EM-01

INSTALLING AND REMOVING THE SIM CARD

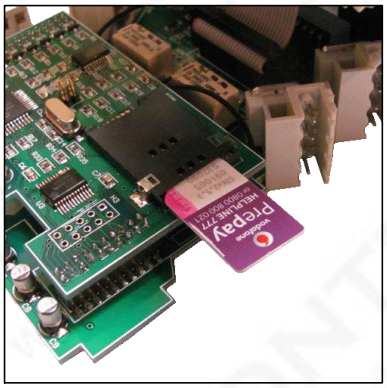
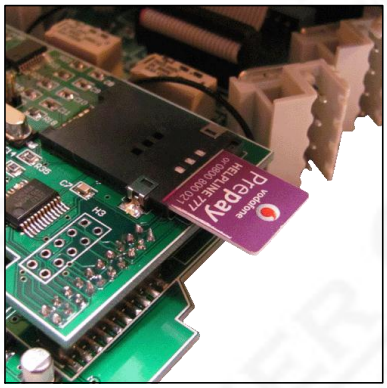
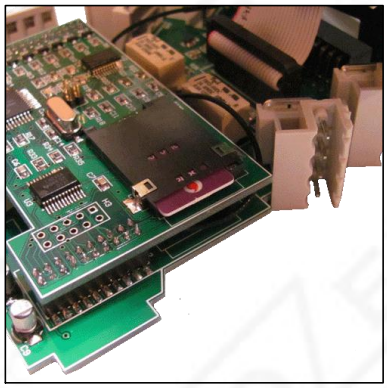
The images below show the procedure of installing the SIM Card

View from Outside the Enclosure:





View from Inside the Enclosure (this is just for indication purposes. **Opening the enclosure will void the warranty**)

To Install the SIM Card push the card as far as it can go until a clicking sound is heard. As soon as pressure is released from the edge of the card it will move back out by a couple of millimeters. This motion will lock the card in place

To remove the SIM Card push the card in until a clicking sound is heard. As the pressure is released from the card's edge it will move out by a few millimeters. Pull the card until it is completely out of the socket.

Extra care should be taken when inserting the SIM card as pushing and releasing it in the wrong position might result in the card being pushed inside the enclosure.

SMS STRING FORMATS

MONITORING OF POWER SUPPLY PARAMETERS

SMS Request:

Ref:	1	2	3	4	5	6	7	8	9	10
Chars:	>		0	0	0	0		S	P	P
ASCII: (Dec)	62	32	48	48	48	48	32	83	80	80

Description (> 0000 SPP):

1: Always >
2: Always a Space
3-6: PIN Number – '0000' to '9999'
7: Always a Space
8-10: Always 'SPP'

PIN Requirements:

Both PINs Accepted

Reply:

The device replies with the following information:

- Device Description
- Date and Time at which the SMS was sent
- Power Supply Voltage
- Battery Current
- Power Supply Current
- Temperature
- Analogue Input Value (Raw Value)

.

MONITORING OF POWER SUPPLY SETTINGS

SMS Request:

Ref:	1	2	3	4	5	6	7	8	9	10
Chars:	>		0	0	0	0		S	P	S
ASCII: (Dec)	62	32	48	48	48	48	32	83	80	83

Description (> 0000 SPS):

1: Always >
2: Always a Space
3-6: PIN Number – '0000' to '9999'
7: Always a Space
8-10: Always 'SPS'

PIN Requirements:

Both PINs Accepted

Reply:

The device replies with the following power supply parameters:

- Time in minutes between battery detect tests (in mins)
- Minimum voltage to detect battery presence (in Volts)
- Shutdown Voltage (in Volts)
- Battery low alarm voltage level (in Volts)
- Battery disconnect voltage (in Volts)
- Battery charge current limit (in Amps)
- Length of battery condition test (in mins)
- Time interval between BCTs
- Mains fail check interval during BCT (in mins)

MONITORING OF BATTERY CONDITION TESTING AND DIGITAL INFORMATION

SMS Request:

Ref:	1	2	3	4	5	6	7	8	9	10
Chars:	>		0	0	0	0		S	P	D
ASCII: (Dec)	62	32	48	48	48	48	32	83	80	68

Description (> 0000 SPD):

1: Always >
2: Always a Space
3-6: PIN Number – '0000' to '9999'
7: Always a Space
8-10: Always 'SPD'

PIN Requirements:

Both PINs Accepted

Reply:

The device replies with the following information:

- Battery Condition Test Status
- Battery Low/Charged
- Battery Present/Missing
- Battery Charging/Discharging
- Charge Cycle Activity
- Main Supply Status
- Overloading Status
- Comms. to Power Supply Status
- Digital Outputs Status
- Digital Inputs Status

MONITORING OF ANALOGUE AND DIGITAL INFORMATION

SMS Request:

Ref:	1	2	3	4	5	6	7	8	9	10
Chars:	>		0	0	0	0		S	P	A
ASCII: (Dec)	62	32	48	48	48	48	32	83	80	65

Description (> 0000 SPA):

1: Always >
2: Always a Space
3-6: PIN Number – '0000' to '9999'
7: Always a Space
8-10: Always 'SPA'

PIN Requirements:

Both PINs Accepted

Reply:

The device replies with the following power supply parameters:

- Time in minutes between battery detect tests (in mins)
- Minimum voltage to detect battery presence (in Volts)
- Shutdown Voltage (in Volts)
- Battery low alarm voltage level (in Volts)
- Battery disconnect voltage (in Volts)
- Battery charge current limit (in Amps)
- Length of battery condition test (in mins)

- Time interval between BCTs (in mins)
- Time interval between BCTs (in hours)
- Time interval between BCTs (in days)
- Mains fail check interval during BCT (in mins)

And the following digital information:

- Battery Condition Test Status
- Battery Low/Charged
- Battery Present/Missing
- Battery Charging/Discharging
- Charge Cycle Activity
- Main Supply Status
- Overloading Status
- Communications to Power Supply Status
- Digital Outputs Status
- Digital Inputs Status

CONTROL OF ALL DIGITAL VALUES

SMS Request:

Ref:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Chars:	>		0	0	0	0		C	D	A		0		1		0		1
ASCII: (Dec)	62	32	48	48	48	48	32	67	68	65	32	48	32	49	32	48	32	49

Description (> 0000 CDA 0 1 0 1):

1: Always >
2: Always a Space
3-6: PIN Number – '0000' to '9999'
7: Always a Space
8-10: Always 'CDA'
11: Always a Space
12: BCT Start (1 = Start/0 = No Action)
13: Always a Space
14: Auto BCT Enable (1 = Start/0 = No Action)
15: Always a Space
16: Digital Output 1 (1 = Enable/ 0 = Disable)
17: Always a Space
18: Digital Output 2 (1 = Enable/ 0 = Disable)

PIN Requirements:

Control PIN

Reply:

The device replies with the following information:

- Device Description
- Date and Time at which the SMS was sent
- Confirmation that the message was received

CONTROL OF BATTERY CONDITION TEST

SMS Request:

Ref:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Chars:	>		0	0	0	0		C	D	B	C	T		O	F		F
ASCII: (Dec)	62	32	48	48	48	48	32	67	68	66	67	84	32	79	70	32	70

Description (> 0000 CDBCT OF F):

1: Always >
2: Always a Space
3-6: PIN Number – '0000' to '9999'
7: Always a Space
8-12: Always 'CDBCT'
13: Always a Space
14-15: ON = Turn On/OF = Do Nothing
16: Always a Space
17: F = Request Feedback/N = No Feedback

PIN Requirements:

Control PIN

Reply:

The device replies with the following information:

- Device Description
- Date and Time at which the SMS was sent
- Confirmation that the message was received

ENABLE/DISABLE OF AUTOMATIC BATTERY CONDITION TEST

SMS Request:

Ref:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Chars:	>		0	0	0	0		C	D	C	B	C		O	F		F
ASCII: (Dec)	62	32	48	48	48	48	32	67	68	67	66	67	32	79	70	32	70

Description (> 0000 CDCBC OF F):

1: Always >
2: Always a Space
3-6: PIN Number – '0000' to '9999'
7: Always a Space
8-12: Always 'CDCBC'
13: Always a Space
14-15: ON = Turn On/OF = Do Nothing
16: Always a Space
17: F = Request Feedback/N = No Feedback

PIN Requirements:

Control PIN

Reply:

The device replies with the following information:

- Device Description
- Date and Time at which the SMS was sent
- Confirmation that the message was received

CONTROL OF DIGITAL OUTPUTS

SMS Request:

Ref:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Chars:	>		0	0	0	0		C	D	O	0	1		O	F		F
ASCII: (Dec)	62	32	48	48	48	48	32	67	68	79	48	49	32	79	70	32	70

Description (> 0000 CDO01 OF F):

1: Always >
2: Always a Space
3-6: PIN Number – '0000' to '9999'
7: Always a Space
8-11: Always 'CDO0'
12: 1 for Output 1 and 2 for Output 2
13: Always a Space
14-15: ON = Turn On/OF = Turn Off
16: Always a Space
17: F = Request Feedback/N = No Feedback

PIN Requirements:

Control PIN

Reply:

The device replies with the following information:

- Device Description
- Date and Time at which the SMS was sent
- Confirmation that the message was received

ENABLING OF STARTUP MESSAGE

SMS Request:

Ref:	1	2	3	4	5	6	7	8	9	10
Chars:	>		0	0	0	0		D	M	T
ASCII: (Dec)	62	32	48	48	48	48	32	68	77	84

Description (> 0000 DMT):

1: Always >
2: Always a Space
3-6: PIN Number – '0000' to '9999'
7: Always a Space
8-10: Always 'DMT'

PIN Requirements:

Control PINs

Reply:

The device replies with the following information:

- Device Description
- Date and Time at which the SMS was sent
- Confirmation that the message was received

DISABLING OF STARTUP MESSAGE

SMS Request:

Ref:	1	2	3	4	5	6	7	8	9	10
Chars:	>		0	0	0	0		D	M	P
ASCII: (Dec)	62	32	48	48	48	48	32	68	77	80

Description (> 0000 DMP):

1: Always >
2: Always a Space
3-6: PIN Number – '0000' to '9999'
7: Always a Space
8-10: Always 'DMP'

PIN Requirements:

Control PINs

Reply:

The device replies with the following information:

- Device Description
- Date and Time at which the SMS was sent
- Confirmation that the message was received

SETTING OF TIME AND DATE

SMS Request:

Ref:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Chars:	>		0	0	0	0		C	D	T		D	0	1	0	8	1	2		T	0	9	3	2	4	5
ASCII: (Dec)	62	32	48	48	48	48	32	67	68	84	32	68	48	49	48	56	49	50	32	84	48	57	51	50	52	53

Description (> 0000 CDT D010812 T093245):

1: Always >
2: Always a Space
3-6: PIN Number – '0000' to '9999'
7: Always a Space
8-10: Always 'CDT'
11: Always a Space
12: Always D (Date)
13-14: Day
15-16: Month
17-18: Year
19: Always a Space
20: Always T (Time)
21-22: Hours
23-24: Minutes
25-26: Seconds

PIN Requirements:

Control PIN

Reply:

The device replies with the following information:

- Device Description
- Date and Time at which the SMS was sent
- Confirmation that the message was received

AUTOMATIC MESSAGING CONTROL

SMS Request:

Ref:	1	2	3	4	5	6	7	8	9	10
Chars:	>		0	0	0	0		A	M	1
ASCII: (Dec)	62	32	48	48	48	48	32	65	77	49

Description (> 0000 AM1):

1: Always >
2: Always a Space
3-6: PIN Number – '0000' to '9999'
7: Always a Space
8-9: Always 'AM'
10: Interval Selection
0 = Off, 1 = 5 Minutes
2 = 10 Minutes, 3 = 20 Minutes,
4 = 60 Minutes, 5 = 150 Minutes,
6 = 300 Minutes, 7 = 600 Minutes,
8 = 1200 Minutes

PIN Requirements:

Control PIN

Reply:

The device replies with the following information:

- Device Description
- Date and Time at which the SMS was sent
- Confirmation that the message was received

SETTING OF PHONE NUMBERS

SMS Request:

Ref:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Chars:	>		0	0	0	0		D	P	1		+	6	4	2	1	2	3	4	5	6	7	8
ASCII: (Dec)	62	32	48	48	48	48	32	68	80	49	32	43	54	52	50	49	50	51	52	53	54	55	56

Description (> 0000 DP1 +64212345678):

1: Always >
2: Always a Space
3-6: PIN Number – '0000' to '9999'
7: Always a Space
8-10: Always 'DP1'
11: Always a Space
12: Always a + (Part of the Phone Number)
13-23 Phone Number
(Phone Number can have a maximum of 15 Digits, excluding +)

PIN Requirements:

Control PIN

Reply:

The device replies with the following information:

- Device Description
- Date and Time at which the SMS was sent
- Confirmation that the message was received

DEVICE CONFIGURATION

Instruction on how to configure this device using the uSCADA software can be found in the manual:

- DoZeener uSCADA for SMS (DZC-PCS-microSCADASMS).
  Document Code: DZC-PCSF-0010011-EM-01

In Appendix 'Device Configuration, Setup and Monitoring'

SPECIFICATIONS

ELECTRICAL

- Power Supply: 9-36VAC/DC
- Relay Outputs: 2 x 500mA @ 24VDC Changeover Contact
- Digital Inputs: Non Isolated - Volt-Free

COMMUNICATIONS

- Serial Connection to Innovative Energies Power Supply Communication Port: Non-Isolated 2-Wire RS485
- Programming Port: Non-Isolated RS232
- Modem Communication Port: Non-Isolated RS232

HARDWARE

- Housing: 2 Module DIN Rail Mounted
- Dimensions: Height 110mm x Width 46mm x Depth 112mm
- Connector Spacing: 5mm
- Cable Connections: 24-14AWG
- Temperature: -10 to 60 DegC

LED INDICATIONS

- Power: Internal Power Supply 1 On
- Power: Internal Power Supply 2 On
- Diagnostics: GSM Modem Switched ON
- Diagnostics: General Health Indication.
- Diagnostics: Communication Receive / Communications Failure
- Diagnostics: Communication Transmit.
- Inputs: Digital Inputs 1 to 8 On/Off indication.
- Outputs: Digital Outputs 1 to 2 On/Off indication.

REVISION HISTORY

Revision Number	Date Revised	Revised By	Description
1	4-Mar-12	RM	Initial Revision